Body Image Perception of Undergraduate Females as it Relates to Disordered Eating and Psychological Conditions

Natalie Swierkosz

Project Advisor: Dr. Jill Clutter

Co-advisor: Dr. Chris Taylor

Undergraduate Honors Thesis

School of Allied Medical Professions

The Ohio State University

Abstract

Objectives: The purpose of this research was to determine the accuracy of body image perception among domestic undergraduate women at four-year universities. Analysis was also performed to determine if women who overestimated body mass index (BMI) would be more likely to report the desire to lose weight and what behaviors they were using to do so, as well as if they were more likely to experience psychological disorders such as depression and anxiety. Previous research suggests that undergraduate females with a negative body image are at high risk for developing patterns of disordered eating and psychological conditions.

Methods: This was a retrospective cross-sectional study. Data was obtained through the American College Health Association and was analyzed using the Statistical Package for Social Sciences (SPSS v 17.0). Data came from participants in the 2005 National College Health Assessment. For All males, graduate students, and international students were excluded in order to isolate the target population.

Results: Results indicated that the majority of undergraduate females have an accurate body image perception. However, those women who overestimated their actual body weight were much more likely to express the desire to lose weight than those with accurate perception or those who underestimate. Women who perceive themselves as being heavier than they truly are were more likely to report taking action to lose weight, including partaking in unhealthy behaviors such as vomiting and taking diet pills. This group of women was also more likely to have an eating disorder, either anorexia or bulimia. In terms of psychological conditions, no connection to body image perception was found. Women who overestimated body weight were not more likely to report

feeling depressed, having an anxiety disorder, or ever having a medical diagnosis of depression.

Conclusions: Most domestic undergraduate females have an accurate, healthy perception of their bodies. Women who do overestimate their body weight are more likely to attempt to lose weight and participate in behaviors to do so, ranging from dieting and exercising to self-induced vomiting and taking diet pills. These women are slightly more at risk for developing an eating disorder as well. There appears to be no link between body image perception and psychological disorders such as anxiety and depression. This could be due to underreporting or the fact that the instrument may not have been sensitive enough to demonstrate a connection.

Problem Statement

While so much focus is placed on the increasing rates of obesity in both child and adult populations, eating disorders are also a cause for growing concern in society today. Along with those who overindulge in food and thus suffer a plethora of resultant health consequences are those who restrict dietary intake and practice unhealthy habits such as binging and purging. Specifically, eating disorders are increasingly prevalent among the female population. According to the Academy for Eating Disorders, as many as 90-95% of eating disorder cases occur in women. Approximately 1% of late adolescent girls will meet the criteria to be diagnosed with anorexia while an additional 2% will be diagnosed with bulimia. At any given moment, 10% of women report eating disorder symptoms[1]. A national survey of school teachers indicated their belief that between 50% and 75% of adolescent girls practice dieting, while nationally, only 14% of adolescent girls are actually overweight. When a child diets before the age of 14, she is 8 times more like to develop an eating disorder later in life[2]. Eating disorders are often believed to stem from body image disturbance, which is on the rise in Western societies. In addition to anorexia and bulimia, distorted body image is also related to mental disturbances such as body dysmorphic disorder, depression, and anxiety[3]. It is a widely accepted belief that one's perception of her weight plays a key role in body dissatisfaction and disordered eating[4]. Knowing these signs and risk factors for eating disorders, it is important to be on the lookout for them so that they can be addressed early on to prevent them from developing into full-blown eating disorders. Early detection of factors associated with disordered eating such as distorted body image and depression may lead to better preventive measures in the long run. The Social Cognitive Theory, which was developed by

psychologist Alfred Bandura in 1962, states that there is a triadic interaction between personal factors, behavior, and the environment[5]. If a person has a distorted body image and is thus at risk for developing an eating disorder, this is a personal factor and behavior that may be influenced by the environment. Therefore if a person is identified to have the risk factors for eating disorders, perhaps the surrounding environment can be altered in a way that would prevent the development of a serious eating disorder.

Related Research

The term body image is one that is very complex and that has evolved over time. In 1950, it was defined by Schilder as "the picture of our own body which we form in our mind…the way in which the body appears to ourselves. More recently, the term reflects a person's ability to regard one's body parts as belonging to the self. It is a subjective, mental representation of one's physical appearance that is constructed from many domains. Factors influencing body image are self-observation, other people's reactions, emotions, memories, and experiences. Dissatisfaction with one's body is increasingly prevalent on college campuses today, and it is closely associated with the drive for thinness[6].

Evidence suggests that certain subgroups of the population are much more likely to partake in inappropriate weight loss behaviors, such as vomiting and the use of laxatives. In particular, college-aged women are especially susceptible to these behaviors. Among collegiate females, prevalence of eating disorders is an estimated 2.9-3.3% [7]. Relative to their male counterparts, undergraduate women have a lower physical self perception and a greater tendency to have a distorted body image. Women are much more likely than men to categorize themselves as overweight. Also, women of normal weight

had a higher percentage of reporting that they were overweight than did men of normal weight[8]. In 1990, Adame and Frank performed research that found that a staggering 61% of normal weight women reported that they felt they were overweight[6]. A study performed by Wilson, Tripp, and Boland indicated that the extent to which someone perceived herself as being overweight was a much more powerful predictor of body dissatisfaction, body esteem, and disordered eating than was her actual numeric BMI[4]. Another finding that links inaccurate body image perception with eating disorders was discovered in a study that asked three different groups of women to estimate their BMI. The first was a group of healthy controls who had no history or current symptoms of eating disorders, the second was a group of anorexics from the Eating Disorder In-Patient Service at the Royal Victoria Infirmary, and the third was a group of bulimics from the same facility. The group of controls overestimated their BMI by an average of 1.42 BMI units, the bulimics by 2.43 units, and the anorexics by 4.28 units. The difference in overestimation between the healthy women and the women with eating disorders was statistically significant[9].

On college campuses, overestimation of BMI and body dissatisfaction are increasingly prevalent because students, particularly females, are frequently assessed based upon their level of physical attractiveness. It is important to note that the relationship between body image perception and eating disorders is well documented. A study of 433 first-year undergraduate students revealed sex differences in 4 of 5 dimensions used to measure body image. Women in this study exhibited higher degrees of body surveillance, body shame, dissatisfaction with weight and physical appearance, and a greater discrepancy between their ideal and real body figures[6]. Another study which

was published in the Journal of American College Health reported similar findings. Sixteen percent of female participants suffered body weight distortion as opposed to 12% of males. Females were also twice as likely as males to report that they were attempting to lose weight. Another statistic differentiating the females from the males was the fact that 4% of females reported vomiting or using laxatives in order to lose weight as opposed to only 1% of male respondents. The study was then further segmented to differentiate between females with accurate physical self-perception and those whose perceptions were inaccurate. Women who inaccurately perceived their weights were more than two times as likely to be partaking in unhealthy behaviors to lose weight. Women who self-reported themselves as anorexic were significantly more likely to perceive their weight inaccurately, as were those with self-reported bulimia nervosa[8].

In a study that included 18,512 college students from 22 countries worldwide, similar findings were reported. An average 45% of women from all countries perceived themselves as overweight, compared to only 25% of men. Also, women were 30% more likely than men to report that they were currently trying to lose weight. Subjects in this study were divided into ten deciles based on their BMI, with the first decile corresponding to the thinnest participants. Female subjects in even the lowest BMI deciles reported feeling overweight. To be specific, 17% of women in the third decile and 20% of women in the fourth decile reported feeling overweight. The percentage of women who said they were trying to lose weight followed a similar trajectory along the ten deciles. About 35% of women in the third BMI decile reported attempting to lose weight, despite the fact that they fell within the normal range for BMI[10].

There is much evidence to suggest that perceived body weight has a strong correlation with symptoms of eating disorders. Individuals who are anorexic or bulimic evaluate themselves primarily on the basis of their weight and their body image perceptions are disturbed more often than not[7]. One study's findings suggested that women who overestimate their weight by at least 5% are nearly twice as likely to develop an eating disorder as those who do not[11]. Another study of 540 undergraduate women indicated that body dissatisfaction and BMI were strongly positively correlated with disordered eating behaviors. It showed that the Body Dissatisfaction subscale of the Eating Disorder Inventory, current BMI, and current shape were all significant predictors of bulimic symptoms[7].

Eating disorders are also a cause for concern because they co-exist relatively frequently with anxiety and many mood disorders. Body dissatisfaction has been identified as a common risk factor for both disordered eating and mood disorders[12]. For instance, depression is often associated with a plethora of negative outcomes, such as eating disorders, substance use, binge eating, and dissatisfaction with one's body[12]. Also, the rates of depression are nearly twice as high among females as they are in males[12]. Data collected from the national comorbidity survey of adults indicates that high rates of lifetime diagnosis of any anxiety disorder, mood disorder, or substance use disorder comorbid with bulimia nervosa[13]. Previous studies have found that the prevalence rates for depression among people with eating disorders are as high as 80%[14]. A previous study performed only on women found that women who restricted dietary intake and were told that they weighed five pounds more than they actually did reported lower self esteem,

more anxiety and depression, and less positive moods than did those who were told they weighed less than their actual weight[4].

In another study performed on 202 high school students, subjects completed both the Center for Epidemiologic Studies-Depressed Mood Scale (CSE-D) and the Eating Attitudes Test (EAT-26). Forty percent of students met the cutoff score on the CSE-D, indicating a possibility of significant depressive symptoms while 12% of the students met the cutoff score on the EAT-26, which indicates a possible eating disorder. To establish if these conditions were comorbid, researchers performed a correlation and found that depressive symptoms and eating attitudes had a strong, positive correlation. This finding reaffirms the belief that as disordered eating attitudes increase, so do depressive symptoms[12]. Another similar study attempting to establish this relationship was performed on 80 adolescents enrolled in a randomized clinical trial comparing family-based treatment for eating disorders vs. individual psychotherapy. Of the 80 participants, 46% met the full criteria for bulimia, while the remaining 54% were classified as subthreshold bulimia based upon frequency of about one binge/purge episode over the past six months. An overwhelming 62.5% of the subjects had at least one co-occurring psychiatric disorder. Mood disorders were found in 47.5% of the sample, while there was a 3.8% frequency of anxiety disorders, 7.5% frequency of subthreshold anxiety or depression, and 3.8% with some other psychiatric condition. Of the individuals who met the criteria for depression, about 21% had one secondary anxiety disorder diagnosis, and 7.9% had two or more co-occurring anxiety disorders[13].

The previous findings are of particular importance for college-aged females because previous research supports that adolescents and university students are the age

brackets in which eating disorders occur most frequently, and among university students, gender is a strong predictor of disordered eating[14]. A Turkish study of 269 university students found that females scored nearly three points higher on the Eating Attitudes Test, with higher scores indicating more disordered eating behavior. The cutoff score on the test that indicates an eating disorder is 30, and 13% of female subjects reached this score of 30 or above. Also, 47.2% of the females reported feeling depressed. When Pearson's correlation coefficient was calculated it showed a strong positive correlation eating attitude scores and depression[14].

Objectives of the Study

The main purpose of this study is to see if undergraduate women who overestimate their BMI are more likely to suffer from disordered eating and depressive symptoms than are those who have an accurate perception of weight or those who underestimate their weight. Specifically, the research questions addressed will be:

In a sample of college females:

1. How accurate are the body image perceptions of the undergraduate females surveyed? Did they overestimate their BMI, underestimate it, or did they have a correct perception?
2. Will those women in the group that overestimates BMI express more of a desire to lose weight than do those who have an accurate perception or those who underestimate BMI.
3. Will women who overestimate BMI be more likely to show symptoms of disordered eating, such as vomiting, restricting dietary intake, and

excessively exercising than those who have correct body perceptions or those who underestimate their weight?

4. Will women who overestimate their BMI be more likely to report experiencing symptoms of anxiety and/or depression than those who have accurate body perceptions or those who underestimate their weight?

Procedures

Population and sample: The data analysis for this study was completed using the American College Health Association's National College Health Assessment (NCHA). This is a nationally recognized survey that assists in understanding students' health behaviors and perceptions. The NCHA asks questions about various aspects of health, from alcohol to sexual health to nutrition to mental health. It is a widely used survey, and participation since the spring of 2000 has been a total of 552,192 college students. We used the data from the year 2005, as it is the most recent, relevant data available to us for our purposes. The schools that participate in the NCHA are self-selecting and they include both public and private institutions. The only schools included in the published data are those that randomly select students to participate or those that administered the survey in randomly selected classrooms. When the NCHA was being pilot-tested in 1998-1999, it was analyzed for reliability and validity by comparing it to a number of nationally representative databases. Among these databases are the CDC's National College Health Risk Behavior Survey, the Harvard School of Public Health 1999 College Alcohol Study, and the National College Women Sexual Victimization Study 2000 which was developed by the United States Department of Justice. The first NCHA in 2000 after

the pilot tests were completed included 28 schools and 16,028 participants, and it has continued to grow each year since then[15].

Design: This descriptive design represents a retrospective, causal-comparative study.

Instrumentation and data analysis: For the purpose of this study, we reviewed questions on the NCHA that asked about the behaviors that have been identified as being related with to development of disordered eating, such as perception of weight, depression, anxiety, and measures taken to lose weight. We also looked at questions about the background of the females in order to get a feel for who are subjects were. Some of these questions were about year in school and ethnic background. Specifically, the questions we used for our study were:

35) How do you describe your weight?

36) Are you trying to do any of the following about your weight?

- I am not trying to do anything about my weight
- Stay the same weight
- Lose weight
- Gain weight

37) Within the last 30 days, did you do any of the following?

- Exercise to lose weight
- Diet to lose weight
- Vomit or take laxatives to lose weight
- Take diet pills to lose weight
- I didn’t do any of the above

40) Within the last school year how many times have you:

- Felt things were hopeless
- Felt overwhelmed
- Felt very sad
- Felt so depressed that it was difficult to function

41) Have you been diagnosed with depression

- For those who answered yes:
  - Have you been diagnosed with depression within the last school year?
  - Are you currently in therapy for depression?
  - Are you currently taking medication for depression?

43) Within the last school year, have you had any of the following?

- Anorexia
- Anxiety disorder
- Bulimia
- Depression

Have you ever been diagnosed with any of the following?

- Anorexia
- Anxiety disorder
- Bulimia
- Depression

44) Within the last school year, have any of the following affected your academic performance?

- Depression/Anxiety Disorder/ Seasonal Affective Disorder

- Eating disorder/ problem

46) What is your sex?

47) What is your height in feet and inches?

48) What is your weight in pounds?

49) Year in School

- 1st year undergraduate
- 2nd year undergraduate
- 3rd year undergraduate
- 4th year undergraduate

51) How do you usually describe yourself?

- White-not Hispanic (includes Middle Eastern)
- Black- not Hispanic
- Hispanic or Latino
- Asian or Pacific Islander
- American Indian or Alaskan Native
- Other

Percentages, means, and standard deviations will be used to describe our sample.

Research question #1 will be answered using a Spearman's correlation coefficient.

Research questions 2 and 3 will be answered using chi square analyses.

Statistical Package for the Social Sciences (SPSS v. 17.0), necessary for the analyses, is available in the research computer in 306 Atwell.

Results

For the purposes of this research, the sample of students who completed this survey was narrowed down based on exclusion and inclusion criteria. Results from all males and all students at the graduate level were eliminated. Results from international students were also excluded, with the thought that being raised in a foreign culture would have a significant influence on survey responses. Since there was no question asking specifically about the respondents' actual BMI, the questions asking about height and weight were used to compute BMI. The answers for this question were coded into categories underweight, normal weight, slightly overweight, and obese.

The total sample existed of 22,254 undergraduate female students. Thirty one point nine percent of the sample were freshman, 23.7% were sophomores, 21.6% were juniors, 17.7% were fourth-year seniors, and the remaining 5.1% were fifth-year seniors or beyone. Six point six percent were Asian, while 6.3% identified themselves as Hispanic. Black students made up 5.5% of the population, and 0.91% were Indian. The majority of students, 80.0% of them, were white. The remaining 3.0% identified themselves as "other."

Question 1:

Question 1 was aimed at determining the accuracy with which the undergraduate females could estimate their BMI. After computing the variable for BMI, we put all the subjects (21,325) into distinct categories, which were underweight, normal, slightly overweight, and obese. A total of 1544 were in the BMI category of underweight, which was a total of 7.2% of the 21,325 students who provided valid answers to the question. Those who were in the category of normal weight accounted for the majority of the sample, with 14,881 (70%) meeting the criteria for normal BMI. The next BMI category

was slightly overweight, which accounted for 3532 (16.6%) of the sample of 21,325. The final category was obese, which accounted for the smallest portion of the respondents. One thousand three hundred and sixty eight (6.4%) of the undergraduate females met the criteria for obese.

The survey respondents then answered a question about how they perceived their body weight. The possible answers were underweight, normal, slightly overweight, and very overweight. We performed a crosstabulation with the answers for perceived weight and actual BMI to determine the accuracy of the undergraduate females' body image perceptions. Based on the crosstabulation, we then put the subjects into three categories based on accuracy: those who underestimate their BMI, those with an accurate perception of BMI, and those who overestimated their BMI.

Of the 1544 females whose actual BMI put them into the category of underweight, 851 of them had an accurate perception and said that they perceived themselves as being underweight. The remaining 693 respondents in the BMI category of underweight said they perceived themselves as being either of normal weight, slightly overweight, or very overweight. For specific percentages, refer to table 1.

We then went on to analyze the women whose actual BMI put them into the category of normal weight. Six point five percent of the total 14881 said they perceived themselves as being underweight. These women were placed in the underestimate category. The majority of this group (70.7%) had an accurate perception and said they perceived themselves as being at a normal weight. The remaining 22.8% women in this category perceived themselves as either slightly overweight or very overweight.

The next category of females were those whose BMI categorized them as being slightly overweight. It was determined that 13.5% of these women underestimated their BMI because. The large majority of respondents in the slightly overweight category had an accurate body perception. The remaining people in this category overestimated their body weight and placed themselves into the category of very overweight. Refer to Table 1 for specific numbers and percentages.

The final category of survey respondents to analyze were those with a BMI in the category of very overweight. The majority of them underestimated their BMI to a certain extent. Sixty five point nine percent were in the category of underestimating their weight and the remaining 34.1% had an accurate body image perception.

	Actual Weight Status			
Perceived weight	**Underweight**	**Normal weight**	**Overweight**	**Obese**
Underweight	851 (55.1)	961 (6.5)	27 (0.8)	16 (1.2)
Normal	587 (38)	10517 (70.7)	449 (12.7)	47 (3.4)
Slightly overweight	102 (6.6)	3382 (22.7)	2949 (83.5)	839 (61.3)
Very overweight	4 (0.3)	21 (0.1)	107 (3)	466 (34.1)

Data provided as n (%)
Pink indicates accurate weight perception, green indicates overestimation of weight and orange represents underestimation of weight.

Table 1: Frequency of perceived weight status by Actual Weight Status of US College Students

The next task was to combine the numbers from all four BMI groups to determine the total percentage of undergraduate females who underestimated, overestimated, and had accurate perceptions of body weight. Of the 21,325 survey respondents who provided answers to the questions, 69.3% had accurate body image perceptions. A total of 11% of the total population underestimated their BMI. The remaining 19.7% overestimated their BMI. These were the three groups we used to answer the remaining research questions

and draw connections between the accuracy of body image perception and disordered eating as well as anxiety and depression.

Question 2

The next step of the research process was to begin determining if there were any connections between the three accuracy groups we had created and the expressed desire to lose weight. Based on the literature review that was completed prior to the beginning of our results analysis, one might expect that those with a negative body image would be likely to overestimate their BMI and thus be more likely to exhibit an increased desire to lose weight compared with those with an accurate body perception or those who underestimated their body weight.

The first question we looked at was question 36 on the National College Health Assessment, which asked if the survey respondents were trying to do anything about their weight. The possible answers were: I am not trying to do anything about my weight, Stay the same weight, lose weight, or gain weight. Of the total 22,254 undergraduate females included in our study, 21,266 provided valid answers to the question. Data provided by this 95.6% of the study population was analyzed.

A total of 2,328 of the women who underestimated their BMI provided answers to the question. Of this group, 18.1% said they were not trying to do anything about their weight. An additional 23.1% said they were trying to stay the same weight. Slightly over half of this group, 51.8%, said they were trying to lose weight. The remaining 7.0% said they were trying to gain weight.

We then analyzed the group with accurate body perception of BMI. A total of 14,744 of them provided valid answers to the question. Fifteen point one percent said

they were not trying to do anything about their weight. An additional 26.5% said they were trying to stay the same weight. The majority of this group, at 56.1% said they were trying to lose weight. The final 2.3% of those with accurate body perceptions said that they were trying to gain weight.

The final group we analyzed, which was of particular interest to us, was those who overestimated their BMI. A staggering majority of undergraduate females who overestimated their BMI, 79.0% of them to be exact, said that they were taking measures to try to lose weight. This proportion was over 20% higher than in either the accurate or the underestimate group. As one might expect, there appears to be a much higher proportion of women in the group that overestimated BMI who expressed the desire to lose weight compared to women who had an accurate perception or underestimated, where the proportion of women who wanted to lose weight was much lower. For specific numbers and percentages from the data collected for research question 2, refer to table 2 below.

	Accuracy					
	Overestimate		**Accurate**		**Underestimate**	
Trying to do anything about weight?	**n**	**%**	**n**	**%**	**n**	**%**
Nothing	394	9.4%	2226	15.1%	422	18.1%
Stay the same	397	9.5%	3905	26.5%	537	23.1%
Lose weight	3314	79.0%	8268	56.1%	1207	51.8%
Gain weight	89	2.1%	345	2.3%	162	7.0%

Table 2: Frequency of Weight Change Intentions by Weight Accuracy

Question 3

The objective of this question was to determine what behaviors, if any, the undergraduate females included in our study were using to try to lose weight. We sought to discover if there was a link between the accuracy of body image perception and

patterns of disordered eating. Based on the literature review, one could expect to see that the prevalence of participating in behaviors to lose weight we be much more prevalent among those females who overestimated their BMI.

The first question analyzed in order to determine this relationship was "Within the last 30 days did you do any of the following? (Select all that apply)." The possible answers were: Exercise to lose weight, Diet to lose weight, Vomit or take laxatives to lose weight, Take diet pills to lose weight, and I didn't do any of the above. We performed five crosstabulations with each of these responses and our accuracy groups. On the crosstabs, an answer of 0 represented no, and an answer of 1 meant that yes, they had partaken in this behavior.

The first component of the question we looked at was examining whether or not the subjects had exercised to lose weight within the last 30 days. Of the group who underestimated their BMI, 72.3% reported that they had exercised to lose weight within the past 30 days, and the remaining 27.7% said that no, they had not. Females with accurate body perception exhibited slightly higher use of exercise (78.5%) to control weight. The over-estimators of BMI reported exercising to lose weight at a rate of 87.7%

The next component of question 37 that we analyzed was if the subjects had reported dieting to lose weight within the past 30 days. As with the component of the question asking about exercising, the highest proportion of dieting to lose weight was reported in the overestimate group. Seventy four point five percent of them said they had dieted to lose weight, which was nearly 20% higher than the percentage reported for the other two groups.

The next component of the question asked if the respondents had vomited or taken laxatives within the past 30 days to lose weight. In the overestimate group, 13.2% of the women reported vomiting or using laxatives to lose weight. This percentage was more than double that found in the accurate and underestimate groups.

The next part of this question we analyzed asked if the subjects had used diet pills to lose weight within the last 30 days. We saw the same results as we had with the previous three components, with the group of female who overestimated BMI reporting a much higher prevalence of practicing this behavior. Twenty four point six percent of the population in this group reported some use of diet pills to lose weight in the past 30 days.

The last possible answer on question 37 was "I didn't do any of the above." As one might expect to see, the lowest proportion of respondents to answer yes to this question occurred in the overestimate group, with only 33.2% of these females saying that they did not do any of the above listed behaviors to lose weight. Results from question 37 for all three accuracy groups can be seen in table 3.

Question 43 was also analyzed in order to determine the prevalence of unhealthy eating habits among our sample of undergraduate females. This question asked, "Within the last school year, have you had any of the following?" It listed thirty different health issues, but the two that were of interest of us for the purposes of our research were anorexia and bulimia. It was expected that prevalence of both anorexia and bulimia would be higher among the group of females who overestimated their body weight.

Of the total 22,254 subjects, 93.3% provided valid answers to the question asking if they had experienced anorexia within the past year. The prevalence rates were low across all three groups, but the highest rate did occur in the overestimate group, as

expected. Three point two percent of these women reported that they had experienced anorexia within the last year.

The question asking if the students had experienced bulimia within the past year was looked at nexxt. Ninety three point one percent of the sample provided valid answers to this question. As with the question about anorexia, very low percentages were reported for all groups. Again, as with anorexia, the overestimate group had the highest proportion of people who answered that they had experienced bulimia. Of this group, 4.7% reported an occurrence of bulimia within the last year. The results from question 43 can be seen in more detail in table 3 below.

	Accuracy		
Behavior	**Overestimate**	**Accurate**	**Underestimate**
Exercise (last 30 d)	87.7%	78.5%	72.3%
Diet (last 30 d)	74.5%	56.2%	55.7%
Vomit (last 30 d)	13.2%	6.5%	5.6%
Pills (last 30 d)	24.6%	14.7%	15.3%
Nothing (last 30 d)	33.2%	51.0%	59.5%
Anorexia (last year)	3.2%	2.2%	2.5%
Bulimia (last year)	4.7%	2.9%	2.3%

Table 3: Frequency of Weight Loss Behaviors by Weight Accuracy

Question 4

The objective of our fourth and final research question was to determine if women who overestimated body weight were more likely to express symptoms of mood disorders such as anxiety and depression. Based on the review of the existing literature, the expectation was that the women in the group who overestimated BMI would be more likely to have a negative perception of self, and thus be more likely to have experienced depression and anxiety.

The first question that was looked at to help make this connection was question 41. This question asked, “Have you ever been diagnosed with depression?” with the only possible answers being Yes and No. This question had a strong response rate of 95.3%. Contradictory to what one may have expected to find, the group with the highest percentage of people to answer yes was those who underestimated BMI rather than those who overestimated it. The proportion who had been diagnosed with depression in the underestimate group was 16.0%, whereas it was only 14.0% in the overestimate group. Those with accurate body image perception showed a slightly lower prevalence of being diagnosed with depression, at 13.5%.

Those who answered yes to the question about having been diagnosed with depression were then asked to answer three more questions relating to depression, the first of which was, “Have you been diagnosed with depression within the last school year?” Again, contradictory to expectation, the underestimate group reported the highest percentage at 32.2%.

The second question asked of those who answered yes to question 41 about ever being diagnosed with depression was “Are you currently in therapy for depression?” The numbers reported were fairly similar for all three of our accuracy groups. The highest percentage of those in therapy for depression occurred in the underestimate group, at 22.7. The lowest percentage reported was for the group of respondents who overestimated their body weight, with twenty point seven percent of the women currently seeking therapy for depression.

The final question that the females who had been diagnosed with depression were asked to answer was, “Are you currently taking medication for depression?” As with the

previous question, the percentages were very close across all three accuracy groups. The group with accurate body perceptions reported the highest proportion of taking depression medication, at 33.0%. Again, the lowest percentage occurred in the group that overestimated BMI, possibly suggesting that these women may be reluctant to seek treatment of any sort. Thirty one point seven percent of this group said that they were currently taking an anti-depressant.

Question 43 on the NCHA was analyzed next to help answer the research question. This question asked, "Within the last school year, have you had any of the following?" Only the answers given for depression and anxiety disorders were looked at for the purpose of this research question. It is a logical expectation based on thorough literature review that women with accurate perceptions of their bodies would be the least likely to have had depression and for those who overestimate their weight to report the highest prevalence of depression. The lowest percentage did occur in the accurate perception group, with 18.7% of the students in this group answering yes. The numbers for the other two groups were very similar. The highest percentage came from the group who underestimated BMI, at 21.7%. The proportion was slightly lower in the group of women who overestimated BMI, with 21.4% of them saying that they had experienced depression in the last school year.

The component of question 43 that asked about anxiety disorders was also analyzed. The expectation was that anxiety disorders would be most prevalent among those women who overestimated their BMI and perceived themselves as being heavier than they were in reality. One also would expect to see that women who had an accurate perception of themselves and were in touch with the size of their bodies would show the

lowest prevalence of anxiety. The lowest proportion of women experiencing anxiety disorders within the past school year did come from the group with accurate BMI perception. Eleven point six percent of them reported having an anxiety disorder. The highest proportion came from the underestimate group, where 13.2% of the women said they had experienced an anxiety disorder. The overestimate group reported a slightly lower amount, at 12.4%. Results from both questions 41 and 43 can be seen in table 4 below.

	Accuracy		
Psychological Concerns	**Overestimate**	**Accurate**	**Underestimate**
Depression experienced	21%	19%	22%
Depression diagnosis	14%	14%	16%
Anxiety experienced	12%	12%	13%

Table 4: Frequency of Psychological Conditions by Weight Accuracy

Discussion and Conclusions

The findings from this study indicate that the majority of domestic, undergraduate female students have an accurate body perception. Those who do not fit this description either underestimate (11.0%) or overestimate (19.7%) their weight. The group of women in the overestimate group are the most likely to express the desire to lose weight and to report practicing behaviors to lose weight that may be unhealthy. They are more likely to diet, exercise, vomit, use laxatives, and take diet pills for the purpose of losing weight. This finding is supported by a study by Wardle titled *Body Image and Weight Control in Young Adults: International Comparisons in University Students from 22 countries*. This study placed women in ten BMI deciles, with the lowest deciles corresponding to the thinnest women. The study found that some of the women in even the lowest BMI deciles

perceived themselves as overweight and were trying to lose weight. Women who overestimated their body weight also reported slightly higher rates of anorexia and bulimia than those with accurate perception and those who underestimated. In terms of psychological conditions, occurrence rates of both anxiety disorders and depression were relatively equal across all three groups. There did not appear to be any link between overestimation of one's body weight and an increased likelihood of anxiety and depression.

One obstacle that has to be taken into account when considering the subject matter of this research study is that of underreporting. Reported rates of vomiting, use of diet pills, anorexia and bulimia, and anxiety and depression were very low. The prevalence may truly be very low, but another possibility is that women who did experience these things did not report it on the survey. Eating disorders and psychological conditions are very sensitive subjects and much stigma is still attached to them today, so many women may not feel comfortable admitting on a survey that they have experienced these things. For that reason, underreporting may have skewed the results of this study. Many previous research studies, such as *Eating Attitudes and Depression in a Turkish Sample* by Kavas, support that there is in fact a correlation between body image and psychological conditions. The results of this study indicated a strong positive correlation between disordered eating habits and depression[14]. Another previous study which was performed only on women found that women who restricted caloric intake and were told that they weighed more than they did in reality reported higher rates of low self esteem, depression and anxiety[4]. Previous research does support that a relationship exists between negative body image, disordered eating, and psychological conditions, however, none

was found in this study. This may be due to a number of reasons. There truly may be no relationship between these two variables, the instrument may not have been sensitive enough to indicate a relationship, or there may have been issues of underreporting that resulted in the lack of correlation indicated.

Another factor that must be taken into account when analyzing the lack of correlation found between body image and psychological conditions is the fact that accuracy groups were not subdivided by culture. All women who fell into each of the three groups (accurate, underestimate, and overestimate) were analyzed together, regardless of their cultural background. One's culture plays an important role in how she perceives herself and how she feels about her body. For instance, in certain cultures, being at a heavier weight may be considered beautiful or desirable, and thus may not be a cause for depression and anxiety.

As the results of this study indicate that there is a relationship between overestimating body weight and increased prevalence of unhealthy behaviors to lose weight, there is evidence that early intervention programs could be put in place to prevent females with a negative body image from developing full-blown eating disorders. Based on the social cognitive theory, which stresses the triadic interaction between personal factors, behavior, and environment, programs that make alterations to the surrounding environment could help prevent the behaviors of disordered eating and psychological conditions from occurring.

More research is needed on the subject of body image perceptions in undergraduate females and the relationship with eating disorders and psychological conditions. Due to the fact that women with eating disorders are likely to be hesitant to

report it, research in a controlled setting with women who have already been identified as having eating disorders would be beneficial. A complete medical history of past medical diagnoses would be effective in determining if women with disordered eating behaviors have a higher prevalence of depression and anxiety.

References

1.) Academy for Eating Disorders, *Prevalence of Eating Disorders*, accessed September 29, 2009. http://www.aedweb.org/eating_disorders/prevalence.cfm

2.) Brandsma, Lynn, "Eating Disorders Across the Lifespan," *Journal of Women & Aging*. 2007; 19: 155-172

3.) Pimenta, A.M. (et. al), "Relationship between body image disturbances and incidence of depression: the SUN prospective cohort," *BMC Public Health*. 02 January 2009; 9: 1-9.

4.) Wilson, Jan M.B. (et. al), "The relative contributions of subjective and objective measures of body shape and size to body image and disordered eating in women," *Journal of Molecular Biology*. 22 June 2005; Body Image 2: 233-47.

5.) University of South Florida, Social Cognitive Theory, accessed September 29, 2009. http://www.med.usf.edu/~kmbrown/Social_Cognitive_Theory_Overview.htm

6.) Lowery, Sarah E. (et. al), "Body Image, Self-Esteem, and Health-Related Behaviors Among Male and Female First-Year College Students," *Journal of College Student Development*. November/December 2005; 46.6: 612-623.

7.) Trautmann, Julie (et. al), "Body Dissatisfaction, Bulimic Symptoms, and Clothing Practices Among Women," *The Journal of Psychology*. 2007; 141(5): 485-498.

8.) Wharton, Christopher M. (et. al), "Weight Loss Practices and Body Weight Perceptions Among US College Students," *Journal of American College Health*. March/April 2008; 56(5): 579-584.

9.) Tovee, Martin J. (et. al), "The estimation of body mass index and physical attractiveness is dependent on the observer's own body mass index," *Biological Sciences*. 7 October 2000; 267(1456): 1987-1997.

10.) Wardle, J. (et. al), "Body image and weight control in young adults: international comparisons in university students from 22 countries," *International Journal of Obesity*. 2006; 30: 644-651.

11.) Conley, Amanda (et. al), "Weight overestimation as an indicator of disordered eating behaviors among young women in the united states," *International Journal of Eating Disorders*. 2007; 40(5): 441-445.

12.) Santos, Melissa (et.al), "Comorbidity between depression and disordered eating in adolescents," *Eating Behaviors*. March 2007; 8: 440-449.

13.) Fischer, Sarah (et. al), "Comorbidity and high-risk behaviors in treatment-seeking adolescents with bulimia nervosa," *International Journal of Eating Disorders*. 2007; 40(8): 751-753.

14.) Kavas, Aysenur Buyukgoze, "Eating attitudes and depression in a Turkish sample," *European Eating Disorders Review*. 17 December 2006; 15: 305-310.

15.) American College Health Association, *ACHA-NCHA Data*, accessed September 26, 2009. http://www.acha-ncha.org/